Particulate matter (PM2.5) dispersion pattern at selected construction in Kuantan, Pahang: Environmental management modeling

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Abstract

The emission of particulate matter is a synonym outcome of the release at the construction site. The emission of particulate involves defining a different phase of activities that occurred. The significance of the study, the emission of PM2.5 depends on the type of activities that occurred during the construction and the relationship of the emission with the present meteorological data. This paper presents the dispersion pattern of PM2.5 (particles less than 2.5 microns in aerodynamic diameter) emitted at the construction site at selected construction in Kuantan, Pahang using the R studio software; an integrated tools development environment for R to map the PM2.5 dispersion pattern. The dispersion pattern shows in Bivariate polar; (blue polar) about 0 to 8 μg/m3 of PM2.5 distributed to the North, Northwest, Southwest, and Northeast areas in the range of 4 m/s to18 m/s within 6 months from June to November 2020. light blue polar distribute in 3 directions; East, West,

and South in the range of 8 µg/m3 to 9 µg/m3 within 6 m/s to 14 m/s. WRPLOT helps in this study to determine the wind speed and wind direction were about 56.17% wind direction with wind speed within 0.5-2.10 m/s (orange), 13.87% wind direction with wind speed within 2.10-3.60 m/s (yellow), 2.5% wind direction with wind speed within 3.60-5.70 m/s and 0.2% wind direction with wind speed more than 5.70 m/s. The calm wind is 27.25% of the time. Consequently, the combination of R studio and WRPLOT can deliver a better relationship outcome for mapping the dispersion pattern of PM2.5 and provide valuable information for decision-making to the policymaker to improve the regulation and enhance guidelines for future air quality monitoring for the country. © 2025 Author(s).

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Abstract

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